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## The Causes and Treatment of Sinuses Resulting from Abdominal Section.

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OF NEW YORK.

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The Causes and Treatment of Sinuses Resulting from Abdominal Section.¹

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ONE of the most impressive, and, I may say, important facts, in connection with the history of morbid conditions in animal life, is the constant effort of nature—or more properly of the vital forces—to protect the body from the results of injury. It matters little what the nature of the injury may be, whether mechanical or chemical, we find this conservative and salutary influence ever present—ever alert to repair existing damage—to anticipate that which may be. Keen observers among the ancients recognized this influence, but were unable to explain it, except by calling it *vis medicatrix naturæ*. It remained for modern pathological anatomy and chemistry, with their minute and laborious investigations and instruments of precision, to analyze this influence and its associated processes and give to the world the magnificent contribution of knowledge which constitutes pathological science as we understand it to-day. What a debt the world owes to such men as Virchow, and Cohnheim, and Lister, and

Koch, and Pasteur, and a host of others, most of them our contemporaries, for their profound and patient labors in this field of inquiry! Thanks to these labors we can understand, as our forefathers could not, how an injured bone protects itself with a zone of callus, how white blood-cells absorb and digest poisonous germs, how the peritonæum throws out a wall of exudate as a means of defence, and why. These wonderful processes are suggestive of something more than the so-called “blind processes of nature;” they speak to us of law working by intelligence.

Not long since I saw in the practice of a friend an extreme illustration of this conservative disposition of nature for the repair of injury, which may serve as the basis thought in the discussion of the question which is under consideration. The patient was a young Irish woman, about 20 years of age, who had been operated on several months prior to the time when I saw her for tubercular peritonitis, the abdominal wound having been left open for drainage. The peritonæum had secreted freely, but instead of agglutination of the visceral and pari-

¹ Read before the Section on Obstetrics and Gynecology, at the meeting of the American Medical Association, held in Detroit, Mich., June 7-10, 1892.

etal surfaces the parietal surface remained free, while a wall of new tissue gradually formed over the omentum and intestines, completely isolating them from the parietal peritonæum. This wall, or cuirass, had its upper limit several inches above the umbilicus, extended well into the flanks laterally, and apparently had its lower limit at the brim of the pelvis, though the bladder, uterus and I believe the appendages were wholly outside of it, in the great sinus between the layer of new tissue and the abdominal wall. This latter circumstance may have been due to the fact that the drainage-tube dipped into the pelvic cavity behind the uterus. This new membrane did not appear to be very vascular, was of a dark-brown color and of rather friable structure. It showed no tendency to adhere to the parietal peritonæum, secreted more or less fluid, and, so far as I could learn, showed little tendency to contract. In fact here was an example, on a colossal scale, of the sinuses, which are of such common occurrence after the performance of abdominal section. The literature of this subject is very meagre; not that the subject is not frequently broached in society discussions, but so far as I have been able to ascertain it has not been systematically investigated. Perhaps the reason is that the subject can best be studied post-mortem, and the lesion in itself is seldom a cause of death. (I have been unable to find records of autopsies in which dissections of abdominal sinuses have been made.)

The object of the sinuses in question, if that expression is allowable, is evidently a conservative one, resulting from the secreting function of

the peritonæum. It is the same process which results in bands and adhesions in all portions of the abdominal and pelvic cavities. It is suggestive of the function of the cuttle-fish, which throws out ink, obscures the water in which it swims, and then escapes from its enemies. The exudate which is thrown out becomes organized, containing connective tissue and blood-vessels, like products of inflammation elsewhere, but the organization is a low one, and while it tends to contract like exudates elsewhere, it frequently does not contract sufficiently to obliterate the lumen of the sinus, in case a distinct lumen has been formed; and, also, retrograde metamorphosis and absorption may not occur, so that the annoyance of a persistent opening, with the discharge of a greater or smaller quantity of pus, may continue indefinitely. There results a severe trial to the patience, and possibly to the strength, of the sufferer, and a tax upon the ability and ingenuity of the surgeon which he may not be able to meet successfully.

We may consider the causes of this unfortunate condition as constitutional, irritative, and septic.

(1) Perhaps it would be better to use the term *predisposing* in place of *constitutional*. Cases in which the peritonæum, from any cause whatsoever, has contracted the habit, as it were, of throwing out excessive secretion, are by virtue of that very habit favorable cases for the formation of sinuses after abdominal section. This is notably true in connection with tuberculosis of the peritonæum, although it is also true that the effect of opening the peritonæal cavity in such cases is frequently curative, and that if sinuses

form the necessary retrogressive changes occur with greater relative frequency than in non-tuberculous cases. Predisposition to sinus formation is also present, in connection with syphilis, malignant disease of the peritonæum, or disease of any of the abdominal viscera in which the visceral or peritoneal circulation is seriously interfered with. In cases in which an abundance of adhesions, either recent or ancient, is found in the abdominal or pelvic cavity, as the result of an inflammatory process, we are in the presence of an irritable peritonæum with a predisposition to sinus formation under favoring conditions. The mere agglutination of coils of intestine to each other may be the first step in this process, and should these become adherent to the parietal peritonæum in the vicinity of the abdominal wound, and the latter fail to close, or be reopened by a force from above or below, the sinus would be complete.

(2) The cause which seems more fruitful than all others in the production of sinuses, I have termed irritative. Perhaps it would be better to speak at first of mechanical irritation, for septic causes are also irritative, but act chemically as well as mechanically. Drainage and suture or ligature material, of whatever substance composed, is the principal means by which this irritative action is caused. At present we are considering only its irritative action as a foreign body, without reference to septic elements, which are frequently associated with it. Chief among these irritative agents are glass drainage tubes. It matters little whether their calibre be large or small, when used too long in some cases, and when used at all in others, whether properly or improperly adjusted, the

result will be a sinus. Their presence irritates the sensitive peritonæum of the intestines and omentum which snugly embrace them. The exuding secretion in a short time (Tait says in seventy to eighty hours) forms a mould around the tube, the intestines are agglutinated to the mould and to each other, and thus a cavity is formed which is walled off from the abdominal viscera. When the drainage tube is removed the concentric pressure of the surrounding structures upon the walls of the sinus may cause them to collapse, and disintegration and absorption may gradually accomplish their complete removal. But in the unfavorable cases these results do not ensue, but the sinus walls become more completely organized, and the consequent phenomena of granulation may continue indefinitely.

Sinuses may also be caused by the irritation of too many or too large sutures or ligatures, or by the loosening of ligatures around tissues which have shrunk or atrophied. Such an irritation may be an aseptic one, as has been described by Bumm. Such sinuses are without the well-marked wall which occurs when the drainage tube has been the irritating cause. They are formed by the agglutination of coils of intestines, the exudate varying in thickness, of course, with the intensity of the process and the sensitiveness of the peritonæum to irritation. The track of such sinuses may be long, irregular and intricate, and they may contain pockets of considerable capacity, which will give rise to no end of uncertainty and surmising in attempts at exploration and treatment. That ligatures were the cause of sinuses was long since observed by the earlier ovariologists,

and this fact induced some of them to endeavor to dispense with ligatures as far as possible. Thus Keith substituted the actual cautery for the pedicle ligature, and Peaslee devised a plan for cutting and removing the pedicle ligature after it had been in position long enough to insure freedom from hæmorrhage. These methods have never been improved upon, though they have been forgotten or ignored by many abdominal surgeons. The use of gauze as a means of drainage within the abdomen is a distinct indication of progress. The irritation which it causes is probably less intense than results from the use of any solid material. The gradual withdrawal of the gauze is probably more favorable to the breaking up of newly formed plastic material than the withdrawal of the drainage tube, and the entrance and development of poisonous germs within the peritonæal cavity is certainly as little facilitated by this as by the use of any drainage material. These and other considerations have induced some surgeons to discard the drainage tube in favor of gauze, especially in view of the fact that drainage with gauze seems to be quite efficient. The matter is of so much importance that it seems worthy of more extensive study and discussion than it has yet received. The same objections which have been urged against glass drainage tubes are applicable to tubes of rubber, bone, or other more or less firm material. It is assumed that the subject of drainage of the abdominal cavity is intrinsically so important that it will be universally admitted that substances should be used which will be certain to provoke the least irritation.

(3) The subject of sepsis as a cause

of abdominal sinuses is as yet too obscure to admit of careful and exact statements. Sinuses not infrequently occur when no drainage tube is used. The abdominal wound is carefully sealed, but sinuses result. It has already been stated that ligatures may by their very presence as foreign bodies excite much irritation, but in how many instances there are also foci of irritation in the form of blood, pus, or serum, within the abdomen or pelvis, or poisonous material which has been introduced from without, which the peritonæum cannot or does not absorb or successfully isolate. Bumm has stated that the gonococcus alone will not cause a septic peritonitis, that it is infectious only upon mucous surfaces, and that its injurious effects cease when it has traversed the mucous membrane of the Fallopian tube; that when it reaches the peritonæum it becomes harmless and is encapsulated. Others have denied this statement, and have reported cases in which gonococci have produced mischievous results upon the peritonæum. Possibly such results may be due to mixed infection, in which, as Bumm states, the streptococcus is associated with the gonococcus and causes peritonæal injury. However this may be the investigations and observations with reference to the question immediately at issue have been mainly clinical. As Sängier has observed (*Deutsche Med. Wochen.*, XVII, 1891, p. 145), experiments such as those of Heinrichius, Loebker and Delbet upon cadavera and animals, furnish no convincing argument, and we are still very much in the dark as to the exact rôle which is played by micro-organisms in this matter. The results which attend

the formation of abdominal sinuses are certainly deleterious. The condition is that of a granulating wound, which is not only annoying to the patient, but destructive to vital force, like persistently granulating processes in any situation. There is more or less interference with the functional activity of the intestines, and danger to vital organs, such as results in all cases from prolonged suppuration. Consequences with which we are all familiar in such cases are fistulæ of the intestines and bladder, prolonged vesical irritation and cystitis, inflammatory diseases of the kidneys, anæmia and intensification of pre-existing tubercular or syphilitic processes. Whatever benefit may have been derived from the performance of the original operation and the removal of diseased structures, is neutralized by the new morbid condition which has been developed, and a very important problem is furnished for our consideration, for which no really efficient means of treatment has as yet been devised. Treatment is rendered the more difficult from the fact that we are frequently unable to explore the cavities as thoroughly as is requisite, on account of their sinuosities, on account of the large areas which are frequently involved, and on account of the danger of penetrating the intestines, or the peritoneal cavity in case active measures of treatment are adopted. The alternatives with which we are confronted, in the matter of treatment, are simple expectancy, palliative measures, or radical ones, which mean reopening the peritoneal cavity, extensive dissection and possible inability, even then, to remove the difficulty. Expectant treatment consists

in doing nothing; in throwing the responsibility of the situation upon the natural reparative forces. This may be considered the method of laziness, or of despair, and yet it is frequently astonishing to see how capably nature manages such situations, if only suitable measures are adopted for the maintenance of the general nutrition. With a fair degree of vitality of the tissues and functions a spontaneous cure not infrequently results. It is not improbable that many cases which pass from our observation are cured in this way; but there are others which remain uncured as long as the patient lives, causing varying degrees of annoyance, but not sufficient to compel re-entrance into a hospital and the adoption of radical procedures.

The palliative method of treatment offers a wide range of measures for selection, the degree of success varying with the vitality of the patient, the area of the sinus and the adaptability of the measure to the given condition. A prerequisite to success is cleanliness, which means not only cleanliness of the external surface of the body contiguous to the opening of the sinus, but cleanliness of the walls of the sinus, its secretions being removed with sufficient frequency and thoroughness. This is not always an easy matter, and sinuses frequently fail to heal on account of the retention and decomposition of secretions. Irrigation should be practised at least once a day, and my preference is for simple hot water, hot Thiersch solution, or hot solution of creolin or carbolic acid. The abdominal opening should be sufficiently large to permit free exit of the discharges. Applications of the nitrate of silver, twenty

or thirty grains to the ounce, sometimes induces satisfactory healing action. A few years ago Dr. Robert Morris recommended the use of a solution of trypsin as an application to the walls of sinuses, for the purpose of digesting the cicatricial tissue and inducing a healthy reparative action. This was recommended by me in two cases in which I was consulted. The cicatricial tissue was indeed digested, but in one of the cases an opening into the bladder was effected, and in the other an opening into the small intestine. The former was cured by persistent drainage of the bladder, the latter by resection of the intestine. This substance must, therefore, be used with the greatest caution. In a number of cases I have packed the sinus with iodoform gauze with good result in sinuses of small calibre, but without such result in those which were extensive. Theoretically, it would seem that thorough drainage from abdomen to vagina would be efficient, but I have one case which has been treated in

this way for three months or more and still remains unhealed. If a pedicle ligature is a cause of irritation, the sinus may still refuse to heal after it has been removed. For obstinate cases there remains only the radical procedure of reopening the abdomen, breaking up all adhesions and dissecting away all adventitious tissue. This may be an operation of great magnitude, and I have known it to fail even with the most skilful operators. It seems to me, however, that it is the true method for the treatment of obstinate cases, and I doubt not that increased experience in technique will make it successful even in such cases. In all cases it must be remembered that violence in exploration, in injection, or in irrigation, are to be rigorously avoided. We must not forget that we are in intimate contact with the thin and often friable wall of the intestine, and that too much manipulation will almost inevitably result in a more serious condition than that from which the patient is already suffering.

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